

**REMARKS**

Claims 1, 2, 7-10, 12-16, 22-24, and 26-42 currently appear in this application. The Office Action of March 31, 2004, has been carefully studied. These claims define novel and unobvious subject matter under Sections 102 and 103 of 35 U.S.C., and therefore should be allowed. Applicants respectfully request favorable reconsideration, entry of the present amendment, and formal allowance of the claims.

**Status of the Claims**

The Examiner alleges that claims 8-10 are improperly amended from the previously presented claims to delete "a silane coupling agent" because the deletion is not reflected in the marked up version of the claims.

Attention is directed to the amendment filed August 4, 2003, in which claims 8-10 were properly amended to delete "a silane coupling agent." This amendment was entered with the filing of a Request for Continued Examination August 26, 2003.

Claim 42 has been amended to limit the substrate to one having DNA immobilized thereon. It is believed that claim 42, and claims 9 and 10, that depend from claim 42, are now patentable.

**Rejections under 35 U.S.C. 112**

Claims 1-2, 7-10, 13-16, 22-24 and 39-42 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement.

This rejection is respectfully traversed. Claims 1, 13 and 16, the independent claims, have now been amended to recite "hydroxyl" in place of -hydrocarbon--.

**Art Rejections**

Claims 42, 9 and 10 are rejected under 35 U.S.C. 102(e) as being anticipated by Santo et al.

This rejection is respectfully traversed. Santo et al disclose the surface treatment of an alumina hydrate with a silane, titanium, aluminum or zirconium coupling agent. An

ink receiving layer on the alumina hydrate is formed by treating with a silane, titanium, aluminum, or zirconium coupling agent. The substrate of the present invention has DNA immobilized thereon, and the alumina of the present invention differs from the alumina hydrate of Santo et al.

Claims 1, 11, 13-16 and 25 are rejected under 35 U.S.C. 1102(b) as being anticipated by, or in the alternative, under 35 U.S.C. 103(a) as obvious over Chrisey et al.

This rejection is respectfully traversed. The present invention is directed to a substrate which is modified by binding a chloride radical by irradiating the surface of the substrate with ultraviolet light, and replacing the chloride by a carboxyl or an epoxy radical. As shown in Table 4 on page 13 of the application as filed, this chloridizing step prior to introducing the hydroxy or epoxy radical produces a substrate in which the peak strength of the hydroxyl radical is increased.

Chrisey et al., on the other hand, use an organosilane coupling agent on a substrate to form an organosilane film or coating. There is no silane coupling agent in the present invention. In the present invention, the

carboxyl groups of epoxy groups are used to modify the surface of the substrate. These carboxy or epoxy groups are formed at the surface of the substrate by irradiating the surface of the substrate with ultraviolet light in an atmosphere of chlorine gas to bind chloride to the substrate, and replacing the chloride by a carboxyl radical. There is nothing Chrisey et al. that even suggests this chloridation step. It is clear from the Examples of the present invention that the prior chloridizing step produces a substrate to which carboxyl radicals are closely bound. In Chrisey et al., the silane coupling agent is bound to a hydroxyl group on the substrate. This is not at all the same as the present invention, in which a carboxyl group is bound to the substrate by displacing a chloride atom on the substrate, rather than binding a silane coupling agent to a substrate which has a hydroxyl group. The only coupling agents used in the substrate of the present invention are titanium or aluminum.

Claims 39-41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chrisey et al. in view of Fodor et al.

This rejection is respectfully traversed. Claims 39-41 recite a solid state substrate according to claim 1, 13 or 16 in which the surface of the chip is roughened. While

Fodor et al. disclose that a substrate having a roughened surface is well known in the art, Fodor et al. do not disclose or suggest that the roughened surface is one which is a solid substrate having a carboxyl group bound thereto, which carboxyl group has been bound by displacing chloride bound to the substrate. Chrisey et al. do not disclose the same substrate as in the present invention, and Fodor et al. add nothing to the Chrisey et al. disclosure to arrive at the type of substrate claimed herein.

Claims 2, 7, 8 and 22-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chrisey et al. in view of Kobashi.

This rejection is respectfully traversed. As discussed above, Chrisey et al. do not disclose the same type of substrate as in the present invention. Kobashi adds nothing to Chrisey et al. because Kobashi discloses fixing bioidentifiers to a substrate by modifying the substrate with terminal hydroxyl, carboxyl, cyano, amino, sulfuric, or nitro groups. There is no disclosure or suggestion for first chloridizing the substrate, and then replacing the chloride with a carboxyl group.

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In view of the above, it is respectfully submitted  
that the claims are now in condition for allowance, and  
favorable action thereon is earnestly solicited.

Respectfully submitted,

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